



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,336	11/13/2003	Kenny Chang	JCLA11475	4087
23900	7590	06/16/2006	EXAMINER	
J C PATENTS, INC.			ARENA, ANDREW OWENS	
4 VENTURE, SUITE 250			ART UNIT	
IRVINE, CA 92618			PAPER NUMBER	

2811

DATE MAILED: 06/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

HA

Office Action Summary	Application No. 10/714,336	Applicant(s) CHANG ET AL.	
	Examiner Andrew O. Arena	Art Unit 2811	

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 24-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 24-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/18/2006 has been entered.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Package substrate comprising bonding metal layer on terminals of passive component and substrate power and ground pads.

The title should not refer to a process or method, since the method claims have been cancelled (amended claims filed 09/08/2005).

Claim Objections

Claims 24, 31, and 38 are objected to because of the following informalities:

The recitation "wherein the surface of the substrate having a die bonding area, the power pad, the ground pad and the signal pad disposed outside the die bonding

area” (ln 3-5) suffers from poor grammar and is confusing. It can be more clearly stated as “wherein, on the surface of the substrate having a die bonding area, the power pad, the ground pad, and the signal pad are disposed outside the die bonding area” or even more clearly and succinctly as “wherein the power pad, the ground pad, and the signal pad are disposed outside the die bonding area.”

The recitation “having a power electrodes” suffers from poor grammar (plural form “electrodes”) and should be replaced with “having a power electrode”.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 24-26, 28, 30-33, 35, 37-39, 41, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tao (US 6,316,828) in view of Stearns (US 5,895,967), Davidson (US 2003/0232463), and Yamaura (US 6,831,360).

All rejections based on Tao refer to Fig 6, examiner has attached a copy of Tao Fig 6, to which has been added two reference numerals (E1, E2) used for clarity.

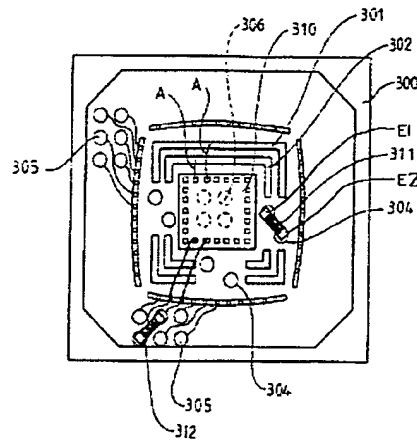


FIG. 6

Regarding claims 24, 31, and 38, Tao discloses a package substrate (300; col 3 In 41) adapted to carry a die (310; col 3 In 46-48) of a wire bonding type (A; col 3 In 37-38), the package substrate at least comprising:

a substrate (300; col 3 In 41) having a surface, a power pad (301; col 3 In 45-46) and a ground pad (302; col 3 In 46), wherein [, on] the surface of the substrate having a die bonding area, the power pad and the ground pad [are] disposed outside the die bonding area (301 and 302 are outside area 310);

at least one passive component (311; col 3 In 42 - see Fig 5) disposed between the power pad and the ground pad (clear in Fig 6), the passive component having a power electrode (E2) connected to the power pad and a ground electrode (E1) connected to the ground pad (col 3 In 44-46);

a first continuous layer on the exposed surface of the power electrode and the exposed surface of the power pad (col 3 In 44; Fig 1: terminals of 102); and

a second continuous layer on the exposed surface of the ground electrode and the exposed surface of the ground pad (col 3 In 44; Fig 1: terminals of 102).

Further regarding claims 24, 31, and 38, Tao differs from the claimed invention in not disclosing a signal pad.

Stearns discloses (Fig 4) a package substrate (62) adapted to carry a die (50; col 6 ln 56) having power, ground, and signal pads (col 6 ln 56-57) connected to corresponding power (46 & 26; col 6 ln 63), ground (44 & 24; col 6 ln 61-62), and signal (48 & signal connection; col 6 ln 64-65) pads on the substrate, all pads disposed outside the die bonding area.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made that the plurality of connection pads on the substrate of Tao include a signal pad, as taught by Stearns; at least for signal communication with the chip.

Further regarding claims 24, 31, and 38, Tao differs from the claimed invention in not expressly disclosing the material of the continuous layers.

Davidson discloses (Fig 2) a package substrate (7; ¶21 ln 1-2) adapted to carry a die (8; ¶21 ln 1), comprising a solder (10; ¶21 ln 2), and teaches the solder may be, *inter alia*, gold, nickel (¶21 ln 6), or a gold-nickel-alloy (¶21 ln 6-8).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made that the continuous layers of Tao be gold (for claim 24), nickel (for claim 31), or gold-nickel-alloy (for claim 38), as taught by Davidson; at least since selection of a suitable material is within the skill level of an ordinary artisan.

Further regarding claims 24, 31, and 38, Tao as modified by Stearns differs from the claimed invention in not expressly disclosing a third layer on the exposed surface of the signal pad.

Yamaura discloses (Fig 3b) a metal layer (4b; col 10 ln 7-8) formed on all the substrate pads (4a; col 10 ln 7-9).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made that the continuous layers of Tao be formed on the exposed surface of the signal pad, as suggested by Yamaura; at least to enhance contact conductivity.

Regarding claims 25, 32, and 39, Tao discloses a patterned solder mask layer disposed the surface of the substrate (col 3 ln 20-22, 41), and exposing surfaces of the power pad and the ground pad (304, 305; col 3 ln 20-22).

Tao as modified by Stearns discloses a signal pad.

Tao as modified by Stearns differs from the claimed invention only in not expressly disclosing the patterned solder mask exposes the surface of a signal pad.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to expose the surface of said signal pad; at least to use said pad.

Regarding claims 26 and 33, Tao discloses a patterned solder mask layer disposed the surface of the substrate (col 3 ln 20-22, 41), wherein the patterned solder mask layer has at least one opening (304; col 3 ln 20-22).

Regarding claims 28, 35, and 41, Tao discloses the passive component (311) is a capacitor (Fig 4).

Regarding claims 30, 37, and 43, Tao as modified by Stearns differs from the claimed invention only in not expressly disclosing the location of the signal pad.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made that the power pad is between the ground pad and the signal pad; at least because selecting location of parts is within the skill level of an ordinary artisan.

Claims 27, 34, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tao in view of Steams, Davidson, and Yamaura, as applied to claims 24, 31, and 38 above, respectively, and further in view of Liu (US 6,713,836).

Regarding claims 27, 34, and 40, Tao differs from the claimed invention only in not expressly disclosing the passive component is an inductor.

Liu discloses (Fig 3&4) a package substrate (col 2 ln 41-44) adapted to carry a die (206; col 2 ln 46) and comprising at least one passive component (224; col 2 ln 43, col 3 ln 16), wherein the passive device is an inductor (col 3 ln 21).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made that at least one passive component of Tao is an inductor, as taught by Liu; at least to improve the electrical properties (Liu: col 3 ln 20-22).

Claims 29, 36, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tao in view of Steams, Davidson, and Yamaura, as applied to claims 24, 31, and 38 above, respectively, and further in view of Brownfield (US 6,683,387)

Regarding claims 29, 36, and 42, Tao differs from the claimed invention only in not expressly disclosing the material of at least one electrode.

Brownfield discloses (Fig 2) a package substrate (22; col 3 ln 38) adapted to carry a die (IC; col 5 ln 6) or a passive component (col 5 ln 7), and discloses the passive component has at least one electrode made of Sn-Pb alloy (col 5 ln 6).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made that the passive component of Tao have at least one electrode made of Sn-Pb alloy, as taught by Brownfield; at least for easy solder bonding.

Response to Arguments

Applicant's arguments filed on 04/18/2006 have been considered but are moot in view of the new grounds of rejection.

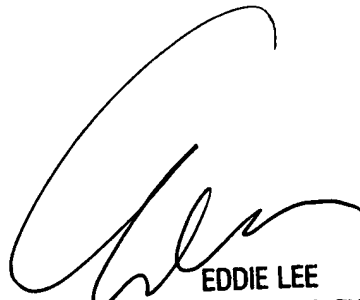
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew O. Arena whose telephone number is (571) 272-5976. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AOA
5 June 2006



EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800